

V.3.3-PLOT-TS PLOT TIME SERIES OPERATION

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Application: All programs

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Description: This Operation will produce up to 6 plots which all use the same time scale.

The Operation will allow any data type to be plotted as long as all the data types on each plot have the same units. The Operation has options to produce a water year plot if all the time series have a 24 hour time interval, to plot only selected periods or to plot only periods in which the data from a selected time series exceeds or are less than a specified criteria. The first two options are not valid for the Operational Forecast Program.

The special provisions of this Operation include the following:

1. all the time series on a plot must have the same units
2. each plot must be allowed at least 20 columns for plotting
3. all the plots must not total more than 120 columns

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Allowable Data Time Intervals: 1, 2, 3, 4, 6, 8, 12 and 24 hours

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Time Series Used: Any type of time series may be plotted however all the time series on a given plot must have the same units. Missing values are allowed.

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Input Summary: The card input for this operation is as follows:

<u>Card</u>	<u>Format</u>	<u>Columns</u>	<u>Contents</u>
1	5X,5A4	6-25	General user supplied heading information
	I5	26-30	Plot option: 1 = water year plot (all time series must be daily) 2 = plot selected periods 3 = plot entire period 4 = plot when data exceeds or are less than a criteria for a selected time series Only plot options 3 and 4 are valid for the Operational Forecast Program. Default is 3.
	I5	31-35	Number of plots (NPLOTS)
	I5	36-40	Total number of time series to be plotted
	I5	41-45	Number of periods to be plotted (zero for plot options 1, 3 and 4)

Repeat cards 2 and 3 for each plot.

2	1X,A4	2-5	Plot type: 'ARIT' = arithmetic plot (default) 'LOG ' = semi-logarithmic plot
	I5	6-10	Number of columns used for this plot (total available for all plots is 120) - default is 120/NPLOTS

<u>Card</u>	<u>Format</u>	<u>Columns</u>	<u>Contents</u>
	F10.0	11-20	Minimum plot ordinate in standard Metric units
	F10.0	21-30	Maximum plot ordinate in standard Metric units
	I5	31-35	Number of time series to be plotted on this plot

Repeat card 3 for each time series to be included on the plot.

3	2X,2A4	3-10	Internal identifier for the time series
	1X,A4	12-15	Data type code for the time series
	3X,I2	19-20	Data time interval for the time series
	8X,3A4	29-40	Time series title (e.g., simulated, observed, etc.)
	4X,A1	45	Plot symbol for the time series (' ', '.' and 'I' are not valid plot symbols)
	2X,2A4	48-55	Time series value name (used only for multi-valued time series data types SMZC and ROCL):

<u>Data Type</u>	<u>Order</u>	<u>Name</u>
SMZC	1	UZTDEF
	2	UZFWC
	3	LZTDEF
	4	LZFSC
	5	LZFPC
ROCL	1	TCHANINF
	2	IMP-RO
	3	DIR-RO
	4	SUR-RO
	5	INTERFLO
	6	SUPBASE
	7	PRIMBASE

Card 4 is only used for plot option 2. Repeat card 4 for each period to be plotted. The periods can be input in any order.

4			Starting date of the period:
	I5	1-5	month
	I5	6-10	day
	I5	11-15	year (4 digits)
			Ending date of the period:
	I5	16-20	month

<u>Card</u>	<u>Format</u>	<u>Columns</u>	<u>Contents</u>
	I5	21-25	day
	I5	26-30	year (4 digits)

Card 5 is only used for plot option 4.

5	2X,2A4	3-10	Internal identifier for the criteria time series
	1X,A4	12-15	Data type for the criteria time series
	3X,I2	19-20	Data time interval for the criteria time series
	F10.0	21-30	Criteria to use for plotting (Metric units)
	I5	31-35	Type of criteria: 0 = minimum criteria 1 = maximum criteria

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Sample Input and Output: Sample input is shown in Figure 1 [\[Bookmark\]](#). Sample output from the parameter print routine is shown in Figure 2 [\[Bookmark\]](#). Sample output from the execution routine is shown in Figure 3 [\[Bookmark\]](#).

The Operational Forecast Program Technique PLOTHYD can be used to control the printing of the execution routine output.

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Error and Warning Messages: The error and warning messages generated by this Operation and the corrective action to take when they occur are as follows:

A. Messages that can occur during setup.

1. ****ERROR** XXXX IS NOT A VALID PLOT OPTION**

Action: Check that the option is 1-4 for the calibration program or 3-4 for the Operational Forecast Program.

2. ****ERROR** PLOT XXXX WAS NOT ALLOCATED ENOUGH COLUMNS**

Action: Check that at least 20 columns have been allocated for the plot.

3. ****ERROR** PLOT XXXX HAS INVALID MINIMUM AND MAXIMUM PLOT ORDINATES**

Action: Check that the maximum ordinate is greater than the minimum ordinate and that both are positive for semi-

logarithmic plots.

4. **ERROR** ALL THE TIME SERIES FOR PLOT XXXX DO NOT HAVE THE SAME UNITS

Action: Check that all the units of the time series for the plot are the same.

5. **ERROR** TS XXXX ON PLOT XXXX HAS AN ILLEGAL SYMBOL

Action: Check that the plot symbol for the time series is not ' ', '.' or 'I'

6. **ERROR** THE TOTAL NUMBER OF COLUMNS ALLOCATED IS GREATER THAN 120

Action: Check that the number of columns allocated to all plots is less than or equal to 120.

7. **ERROR** THE TOTAL NUMBER OF TIME SERIES IS INCORRECT

Action: Check that the total number of time series on card 1 is the sum of the number of time series for each plot.

8. **ERROR** ALL TIME SERIES ARE NOT DAILY

Action: Check plot option. The water year plot option is only valid for daily time series.

9. **ERROR** NOT ENOUGH SPACE ON THE SCRATCH FILE

Action: Reduce the number of Operations that use the scratch file or call the Hydrologic Research Lab for instructions on how to increase the size of the scratch file.

10. **ERROR** THE DATE(S) FOR PERIOD *X** ARE NOT VALID

Action: Check that the starting date for the period is less than or equal to the ending date.

11. **ERROR** THE CRITERIA TIME SERIES WAS NOT FOUND IN THE LIST OF TIME SERIES TO BE PLOTTED

Action: Check that the time series to be used as a criteria time series is one of the time series to be plotted..

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Carryover Transfer Rules: This Operation has no carryover.

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Card Punch Limitations: The punched card formats for this Operation are as follows. A warning is printed if the values are exceeded.

<u>Parameter or Variables</u>	<u>Punch Format</u>	<u>Maximum Value</u>	<u>Minimum Value</u>
Minimum Ordinate	A8	99999999	.0000001
Maximum Ordinate	A8	99999999	.0000001
Criteria Value	A8	99999999	.0000001

Figure 1. Sample Card Input For Operation PLOT-TS

```

- Column -
5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
PLOT-TS      ANMWE
      SAC-SMA --LOWER AREA      3      3      9
ARIT  40      0      101.6      2
  ANMWELWR SMZC      6      LAREA UZTDEF      U      UZTDEF
  ANMWELWR SMZC      6      LAREA LZTDEF      L      LZTDEF
ARIT  40      0      152.4      3
  ANMWELWR SMZC      6      LAREA LZFSC      S      LZFSC
  ANMWELWR SMZC      6      LAREA LZFPC      P      LZFPC
  ANMWELWR SMZC      6      LAREA UZFWC      F      UZFWC
LOG   40      .001      10.      4
  ANMWELWR ROCL      6      LAREA IMP-RO      V      IMP-RO
  ANMWELWR ROCL      6      LAREA INTER      N      INTERFLO
  ANMWELWR ROCL      6      LAREA PRIM      P      PRIMBASE
  ANMWELWR ROCL      6      LAREA SUPP      S      SUPBASE

```

Figure 2. Sample Output From Operation PLOT-TS Print Parameter Routine

```

*****
PLOT-TS OPERATION      NAME=ANMWE      PREVIOUS NAME=
*****

PLOT TIME SERIES OPERATION      SAC-SMA --LOWER AREA

      PLOT TIME INTERVAL = 6 HOURS

      *** PLOT 1 ***
PLOT SCALE IS ARITHMETIC      USING 40 COLUMNS
MIN ORDINATE = .00000E+00 MM      MAX ORDINATE = 101.60 MM

TIME SERIES      I.D.      TYPE      TIME INTERVAL      PLOT SYMBOL
1      ANMWELWR      SMZC      6      U      UZTDEF
2      ANMWELWR      SMZC      6      L      LZTDEF

      *** PLOT 2 ***
PLOT SCALE IS ARITHMETIC      USING 40 COLUMNS
MIN ORDINATE = .00000E+00 MM      MAX ORDINATE = 152.40 MM

TIME SERIES      I.D.      TYPE      TIME INTERVAL      PLOT SYMBOL
1      ANMWELWR      SMZC      6      S      LZFSC
2      ANMWELWR      SMZC      6      P      LZFPC
3      ANMWELWR      SMZC      6      F      UZFWC

      *** PLOT 3 ***
PLOT SCALE IS LOGARITHMIC      USING 40 COLUMNS
MIN ORDINATE = .10000E-02 MM      MAX ORDINATE = 10.000 MM

TIME SERIES      I.D.      TYPE      TIME INTERVAL      PLOT SYMBOL
1      ANMWELWR      ROCL      6      V      IMP-RO
2      ANMWELWR      ROCL      6      N      INTERFLO
3      ANMWELWR      ROCL      6      P      PRIMBASE
4      ANMWELWR      ROCL      6      S      SUPBASE

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Figure 3. Sample Output From Operation PLOT-TUL Execution Routine

```

PLOT TIME SERIES      SAC-SMA --LOWER AREA      *** MAR / 1993 ***      TIME ZONE = MST

                                PLOT 1      UNITS= IN

TIME SERIES      I.D.      TYPE      TIME INTERVAL      TITLE      PLOT SYMBOL
1      ANMWELWR      SMZC      6      LAREA UZTDEF      U      UZTDEF
2      ANMWELWR      SMZC      6      LAREA LZTDEF      L      LZTDEF

                                PLOT 2      UNITS= IN

TIME SERIES      I.D.      TYPE      TIME INTERVAL      TITLE      PLOT SYMBOL
1      ANMWELWR      SMZC      6      LAREA LZFC      S      LZFC
2      ANMWELWR      SMZC      6      LAREA LZFC      P      LZFC
3      ANMWELWR      SMZC      6      LAREA UZFC      F      UZFC

                                PLOT 3      UNITS= IN

TIME SERIES      I.D.      TYPE      TIME INTERVAL      TITLE      PLOT SYMBOL
1      ANMWELWR      ROCL      6      LAREA IMP-RO      V      IMP-RO
2      ANMWELWR      ROCL      6      LAREA INTER      N      INTERFLO
3      ANMWELWR      ROCL      6      LAREA PRIM      P      PRIMBASE
4      ANMWELWR      ROCL      6      LAREA SUPP      S      SUPBASE

DAY HR      .0000      1.0000      2.0000      3.0000      .0000      1.5000      3.0000      4.5000      .00004      .00039      .00394      .03937
29 11      I U      . L      .      .      F      . P      .      .      S      .      P.      .      .
29 17      I U      . L      .      .      F      . P      .      .      S      .      P.      .      .
29 23      I U      . L      .      .      F      . P      .      .      S      .      P.      .      .
30 5      I U      . L      .      .      F      . P      .      .      S      .      P.      .      .
30 11      I U      . L      .      .      F      . P      .      .      S      .      P.      .      .
30 17      I U      . L      .      .      F      . P      .      .      S      .      P.      .      .
30 23      I U      . L      .      .      F      . P      .      .      S      .      P.      .      .
31 5      I U      . L      .      .      F      . P      .      .      S      .      P.      .      .

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